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WOOD ANATOMY OF THE NEOTROPICAL SAPOTACEAE: V. CALOCARPUM. (U)  
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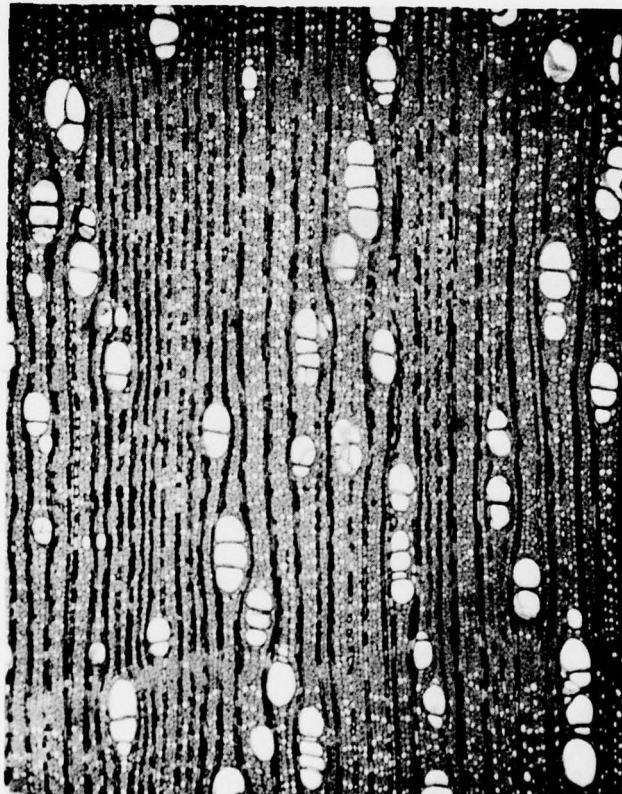
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WOOD ANATOMY  
OF THE  
NEOTROPICAL SAPOTACEAE  
*V. CALOCARPUM*

RESEARCH PAPER FPL 329

FOREST PRODUCTS LABORATORY  
FOREST SERVICE  
U.S. DEPARTMENT OF AGRICULTURE  
MADISON, WIS.

1978



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### Preface

The Sapotaceae form an important part of the ecosystem in the neotropics; for example, limited inventories made in the Amazon Basin indicate that this family makes up about 25% of the standing timber volume there. This would represent an astronomical volume of timber but at present only a very small fraction is being utilized. Obviously, better information would help utilization--especially if that information can result in clear identification of species.

The Sapotaceae represent a well-marked and natural family but the homogeneous nature of their floral characters makes generic identification extremely difficult. This in turn is responsible for the extensive synonymy.

Baehni and Bernardi state the situation with respect to Peru but this would hold equally well for all of the neotropics: "For instance, of the 39 species and one variety described hereunder, 13 are known only from the Peruvian type; and 23 taxa here presented have no fruit or seed. It is universally admitted that the taxonomy of this family is almost impossible without--for the same species--leaves, flowers, fruits, and seeds."

Unfortunately, species continue to be named on the basis of flowering or fruiting material alone and this continues to add to the already confused state of affairs.

This paper on Calocarpum is the fifth in a series describing the anatomy of the secondary xylem of the neotropical Sapotaceae. The earlier papers, all by the same author and under the same general heading, include:

- I. *Bumelia*--Research Paper FPL 325
- II. *Mastichodendron*--Research Paper FPL 326
- III. *Dipholis*--Research Paper FPL 327
- IV. *Achrouteria*--Research Paper FPL 328

Publication in this manner will afford interested anatomists and taxonomists the time to make known their opinions and all such information is hereby solicited. At the termination of this series the data will be assembled into a single comprehensive unit.

WOOD ANATOMY OF NEOTROPICAL SAPOTACEAE:

V. CALOCARPUM

By

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U.S. Department of Agriculture

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Abstract

Calocarpum, long maintained as a distinct taxon, is now generally considered as a synonym of Pouteria. The wood anatomy is quite different from Pouteria (sensu stricto) and the author is of the opinion that reduction to synonymy is not justified. The anatomical evidence supports the treatment of Calocarpum by the monographer Charles Baehni.

Introduction

Calocarpum was established by Pierre in 1904 and generally upheld even by extreme conservatives such as Baehni (2). It is a very small genus consisting of the type species C. mammosum (L.) Pierre and C. viride Pittier which was described from Guatemala in 1914. Williams (5) writes, "The fruits of the two species vary greatly in size and shape, unlike in every respect so that there is no doubt that two distinct species are represented, yet it seems impossible to separate them for foliage characters." Both species are widely cultivated in the neotropics for their fruit. Because of this widespread distribution resulting from cultivation, the original range is unknown but believed to be in the general area of southern Mexico and northern Central America.

In 1942 Baehni (1) excluded Lucuma sclerocarpa Pittier from his Pouteria "series" and referred this to Calocarpum sp. In 1946, Cronquist (3) made the transfer Pouteria sclerocarpa (Pittier) Cronquist and most recently in 1976, Lundell (4) made the new combination Calocarpum sclerocarpum (Pittier) Lundell. This species is represented by a single

1/ Pioneer Research Unit, FPL. The Laboratory is maintained at Madison, Wis. in cooperation with the University of Wisconsin, Madison.

collection, Pittier 4357, and is known only from the type locality in Panama. A wood specimen taken from the type tree was available for study but was excluded from consideration here because the wood anatomy differs considerably from Calocarpum mammosum, the type of the genus.

In 1946, Cronquist (3) described two additional species from Panama which were included in his "Calocarpum group" in the genus Pouteria: Pouteria fossicola, which is known only from the type locality and described from incomplete flowering material; and Pouteria cooperi, which is also known only from the type specimen (Cooper 499) and was also described from incomplete flowering and fruiting material.

In 1976, Lundell (4) made the new combinations: Calocarpum cooperi (Cronquist) Lundell and Calocarpum fossicolum (Cronquist) Lundell. Wood of fossicolum was not available for study but wood from the type tree of cooperi has been studied and subsequently excluded from Calocarpum on anatomical grounds.

Nomenclatural confusion still exists as evidenced by the fact that in current literature Calocarpum mammosum will be found in synonymy under Pouteria mammosa (L.) Cronquist or as Pouteria sapota (Jacq.) Moore and Stearn.

Of the 12 wood specimens available (table 1) for this study, 10 were named Calocarpum mammosum and two simply as Calocarpum sp. It is quite possible that specimens of Calocarpum viride Pittier may occur in this group of wood specimens due to the difficulty of identifying the species when fruiting material is not available. One wood specimen labeled Calocarpum viride Pittier proved to be from the type tree of Cooper 499, Pouteria cooperi Cronquist and is excluded from consideration.

Contrary to taxonomic consensus, this author maintains Calocarpum because the wood anatomy is distinctive and readily separable from all the other neotropical Sapotaceae.

#### Description

General: Wood light brown, rather drab and lusterless in appearance; with little or no distinction between heartwood and sapwood. Growth rings indistinct or may be demarcated by zones which are relatively free of parenchyma. Specific gravity ranges from 0.57 to 0.88 with an overall average of 0.76.

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Madison, Wis.

Calocarpum, long maintained as a distinct taxon, is generally considered a synonym of Pouteria. However, the wood anatomy differs from Pouteria and the author feels that reduction to synonymy is not justified. Anatomical evidence supports the treatment of Calocarpum by monographer Charles Baehni.

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Anatomical:

Pores most commonly in radial multiples of 2-3 or occasional 4-5 (fig. 1). The pore groups exhibit a distinct tendency toward radial alignment. Maximum pore diameters in different specimens range from 151 to 180  $\mu\text{m}$ . Inter-vessel pitting alternate, 6-8  $\mu\text{m}$  in diameter. Vessel members with simple perforations. Tyloses, when present, thin-walled. Average vessel-member length 800  $\mu\text{m}$ .

Axial parenchyma reticulate or in closely spaced uniseriate bands between the wood rays (fig. 2). Parenchyma cells with rounded corners and showing distinct to prominent intercellular spaces as seen from radial sections (fig. 3). Cells with brown contents generally containing a small particle of silica. Vessel-ray pitting large, irregular in shape and size.

Wood rays 1-4 seriate but in most specimens 2-3 seriate: heterocellular. Uniseriate rays few and very low, generally less than 10 cells high. Height of multiseriate portion of wood rays averages about 590  $\mu\text{m}$ . Ray cells with light brown to dark brown contents along with apparently empty cells. The cells with brown contents generally contain a single spheroidal or "clinker" particle of silica, 20 to 40  $\mu\text{m}$  in diameter. The silica particles are frequently obscured by the dark cell contents. Chemical analysis of Williams 8321 showed a silica content of 2.02 percent.

Wood fibers thick-walled with an average length of 1.85 mm. Vascular tracheids lacking or very rare.

Diagnostic features: Wood light-brown. Parenchyma reticulate with the corners rounded and showing more or less distinctive intercellular spaces. Silica common in the ray cells with dark contents.

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Literature Cited

1. Baehni, Charles.  
1942. Mémoires sur les Sapotacées. II. Le genre Pouteria.  
Candollea 9:426-427.
2. Baehni, Charles.  
1965. Mémoires sur les Sapotacées. III. Inventaire des genres.  
Boissiera II: 106.
3. Cronquist, Arthur.  
1946. Studies in the Sapotaceae. II. Survey of the North American genera. Lloydia 9(4):259.
4. Lundell, Cyrus L.  
1976. Studies in American plants XII. Wrightia 5(7):252.
5. Standley, Paul C., and Louis O. Williams.  
1967. Flora of Guatemala. Fieldiana Bot. 24:Part VIII, No. 3.  
239-243.

Table 1.--Wood specimens of Calocarpum examined

Species	Collector and number	Origin	Numbers in wood collection	
			MADw	SJRw
<hr/>				
<i>mammosum</i> (L.) Pierre	Witford and Stadtmiller	Honduras	10798	3680
	Englesing	13		12414
	Fors	85	Nicaragua	
	Cons. Forests	99	Cuba	13673
	McClay-Clara	29	Belize	14447
	L. Williams	25	Guatemala	23136
	L. Williams	8321	Mexico	16149
	N.S. Stevenson	9272	Mexico	34563
	Cedillo	149	Belize	16148
	(USw 696)	375	Mexico	34801
			Panama	35071
			37788	
			19364	53468
sp.	Calderon	sn	Salvador	7513
sp.	Field Museum	12285	Ecuador	32910

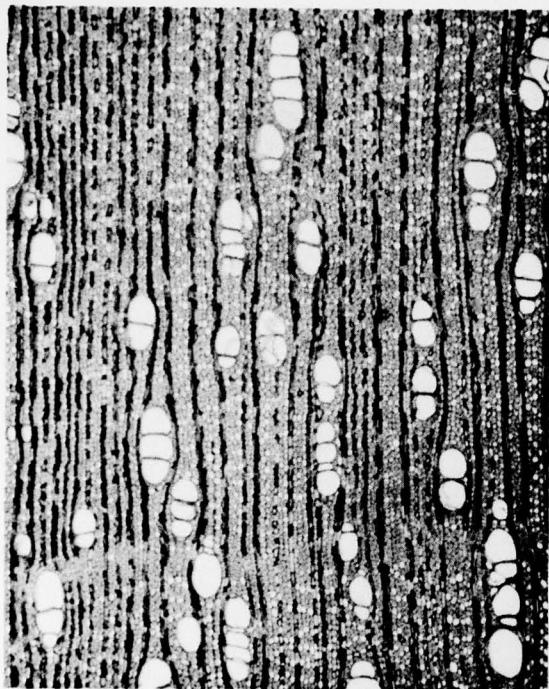


Figure 1.--*C. mammosum* showing typical arrangement of pores and parenchyma. (Whitford-Stadtmailler 13) X 30.

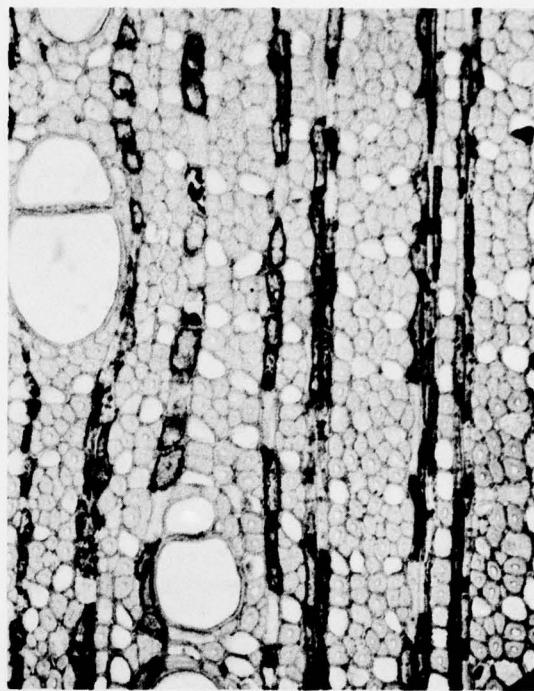


Figure 2.--*C. mammosum* showing parenchyma detail. (Whitford-Stadtmailler 13) X 110.

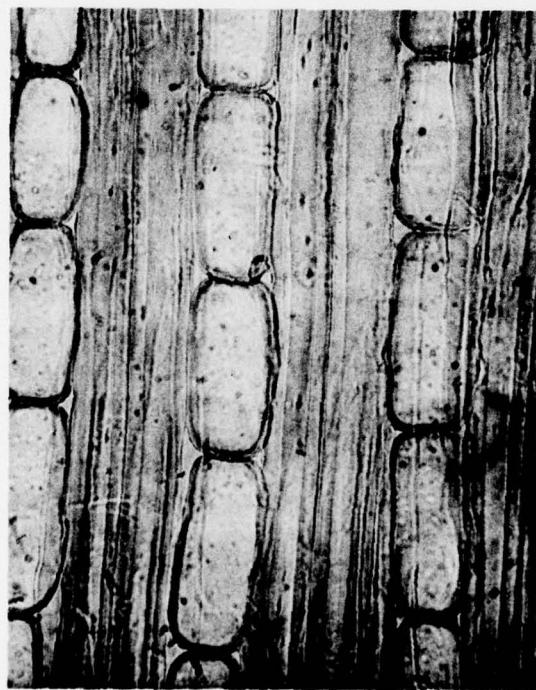


Figure 3.--*C. mammosum* showing the rounded corners of parenchyma cells and intercellular spaces. (Whitford-Stadtmailler 13) X 275.